

change in colour or length of coat \*. The coat is distinctly longer in the winter than in the summer, though the difference does not approach that which obtains in Persian Onagers and Kiangs, and there is a decided difference in colour. The summer coat is a clear grey, which gradually turns to a sandy fawn as the season advances, the difference in tint between the two being very marked when the old sandy-fawn coat comes away and shows the new stone-grey coat beneath it in patches at moulting-time.

LXVI.—On the Fruit-Bats of the Genus *Dobsonia*.

By KNUD ANDERSEN, F.Z.S.

THE subjoined notes and descriptions are based on ninety-one specimens in the collections of the Leyden, Berlin, Paris, and British Museums. The three former Museums were visited by me in August and September this year, and I have much pleasure in taking this opportunity of acknowledging my indebtedness to Dr. Jentink, Professor Matschie, and Professor Trouessart for the liberal way in which they placed the collections under their charge at my disposal. The large series of *Dobsonia* from the Dutch East Indies preserved in the Leyden Museum has been of special importance for my revision of the genus.

The latest reviser (Matschie, 1899) recognized only one species of *Dobsonia*. The total number of species briefly diagnosed below is twelve, six of which are new.

The notes are preliminary to a completer account of the genus in the British Museum Catalogue of Megachiroptera now under preparation.

I. Revised List of hitherto-described Species.

1810, *Pteropus palliatus*, E. Geoffroy, Ann. Mus. d'Hist. Nat. xv. p. 99. In 1825 by Temminck put down as the young of *Cephalotes peroni* [*Dobsonia peroni*] (Mon. Mamm. i. pp. 169, 170), a view accepted also by the original describer in 1828 (Cours d'Hist. Nat. Mamm., 13 leçon, pp. 29, 30), as well as by all later revisers of the genus.—It is evident from Geoffroy's description that the type of *Pt. palliatus* was a quite young *Dobsonia* with the milk-incisors ( $\frac{2-2}{2-2}$ ) *in situ*. As the type locality is unknown, the description confined to

\* Lydekker, Novitates Zool. xi. p. 393 (1904).

characters common to all species of *Dobsonia*, and the type no longer in existence, the species is, and will always remain, indeterminate. Inasmuch as the type was acquired from a Dutch Museum (Teyler, Haarlem), the probability is that it was one of the four species common in the Dutch East Indies, viz. *D. peroni* (Timor group), *viridis* (Amboina group), *moluccensis* (Amboina group), or *crenulata* (Gilolo group).

1810, *Cephalotes peroni*, E. Geoffroy, *t. c.* p. 104, pl. vii. Type locality, Timor. A distinct species, differing from all other forms by the combination of these characters:—Antero-internal corner of  $m_1$  sharply marked off as a distinct cusp or ledge; no well-marked antero-internal ledge in  $m^1$ ; skull, total length 48·8–51·7 mm., maxillary tooth-row (c- $m^2$ , crowns) 20–22, forearm 108·5–117. Range:—Flores, Timor, Alor, Wetter.

1830, *Hypoderma moluccense*, Quoy & Gaimard, Voy. 'Astrolabe,' Zool. i. p. 86, Atl. pl. xi. Type locality, Amboina. In 1837 by Temminck declared indistinguishable from *Cephalotes peroni* (Mon. Mamm. ii. p. 109), an opinion unhesitatingly accepted by all other revisers.—Is a distinct species. Diagnosis:—Antero-internal corner of  $m_1$  not differentiated as a distinct cusp or ledge; general size unusually large, forearm 133·5–141 mm. Range:—Buru, Amboina, Ceram, Ara Islands.

Nearly half a century passed without further additions to the list. The three principal revisers of the genus during this long period, viz. Peters in 1867 (MB. Akad. Berlin), Gray in 1870 (Cat. Monk. &c.), and Dobson in 1878 (Cat. Chir. B. M.), copied Temminck in recognizing only one species, *Cephalotes peroni*, with the synonyms *Pteropus palliatus* and *Hypoderma moluccense*.

1879, *Cephalotes minor*, Dobson, P. Z. S. 1878, p. 875. Type locality, Amberbaki, N.W. New Guinea.—A distinct species. Differential characters:—Premolars and molars simple (no well-marked antero-internal and posterior ledges, no trace of surface ridges); smallest species known, forearm about 80 mm.—The type in the Paris Museum was hitherto the only specimen known to exist in collections. There is, however, a second specimen in the Leyden Museum ("*Cephalotes peroni*" rr, with skull dd), collected by Dr. Bernstein, but unfortunately without locality; as having been acquired by the Leyden Museum in 1876, years after the explorer's death, it probably dates from his last voyage, and, if so, it must have been obtained either in Sorong (N.W. New Guinea), Salawati, Batanta, or neighbourhood (see his "dagboek," edited by Musschenbroek, Bijdr. Taal-, Land- en

Volkenk. Ned. Ind. (4) vii., 1883). The Leyden specimen is fully adult, the type slightly immature (but for all practical purpose perfectly full-grown).

1896, *Cephalotes viridis*, Heude, Mém. Hist. Nat. Emp. Chin. iii. p. 176, footnote, pl. v. fig. 1.—A distinct species. Differential characters:—A well-marked antero-internal basal cusp both in  $m_1$  and  $m^1$ ; breadth across lower edges of lachrymal foramina 11·5–12·8 mm.; forearm 113–117·5. Range:—Buru, Amboina, Ceram, Banda Islands, Key Islands.

The next, and thus far the latest, reviser of the genus (Matschie, 'Megachiroptera des Berliner Museums,' 1899) again recognized only one species, *Cephalotes palliatus*, with the synonyms *Cephalotes peroni*, *Hypoderma moluccense*, *Cephalotes minor*, and *C. viridis*. So far from being identical, these four species represent in reality four different sections of the genus, a fact which, however, can only be realized on examination of their dentition. But quite apart from dental differences, it would only be possible to put the above four species together under one heading on supposition that the individuals show a perfectly unparallelled amount of size variation (forearm in *Dobsonia minor* 80 mm., in *D. moluccensis* 133·5–141).

1905, *Dobsonia magna*, Thomas, Ann. & Mag. N. H. (7) xvi. p. 423. Type locality, Tamata, Mambare River, British New Guinea. A distinct species, closely allied to *D. moluccensis*, from which it differs only in its still larger size (forearm 146–152·5 mm.: largest species known). Range:—The whole of New Guinea; Mysol; Waigeou.

1905, *Cephalotes pannietensis*, De Vis, Ann. Queensl. Mus. vi. p. 36. Type locality, Panniet Island, Louisiade Archipelago. A distinct species: similar in dentition to *D. moluccensis* and *magna*, but much smaller; forearm about 109–112 mm. Range: Trobriand group (Kiriwina), D'Entrecasteaux group (Fergusson Island), Louisiades (Panniet).

In 1906 Dr. Jentink gave a very elaborate table of external measurements of nearly all the specimens of *Dobsonia* in the Leyden Museum (Notes Leyd. Mus. xxviii., table facing p. 168). It is necessary to draw attention to the fact, however, that not all of these measurements are directly comparable. Of the 42 specimens measured 18 are more or less immature (specimens a, g, k, l, n, o, p, q, v, w, x, z, f<sup>2</sup>, g<sup>2</sup>, j<sup>2</sup>, k<sup>2</sup>, p<sup>2</sup>, w<sup>2</sup>).

From the above it will be noticed that all the principal revisers of the genus, from Temminck, through Peters, Gray,

and Dobson, to Matschie, invariably have failed to recognize more than one single species. The reason is that none of these authors have studied the detailed structure of the premolars and molars of the specimens at their disposal, but all confined themselves to an examination of their external features and the more conspicuous (generic) characters of the skull and dentition. And externally all species of *Dobsonia* are in fact essentially alike, in the shape and relative size of the ears, the wing-structure and insertion of the membranes, and the distribution, quality, length, and colour of the fur, in short, in all external characters except one, the size. That the differences in size, though often very conspicuous, sometimes even enormous, were considered indicative only of an unusually great individual variation is readily understood when it is remembered that very often a larger and a smaller species occur together in the same place. Finding the same small island represented in collections by individuals similar to each other in all external characters but size, those authors naturally hesitated to consider the size-difference by itself a character of specific importance. The truth is, however, that whenever an island is inhabited by two species of *Dobsonia*, they differ not only in size but also, and chiefly, in dentition.

## II. Brief Diagnoses of new Species.

### *Dobsonia exoleta*, sp. n.

Similar in dentition to *D. pannietensis*, but larger: skull, total length 52 mm. (47–48 in *pannietensis*), maxillary tooth-row,  $c-m^*$  (crowns) 20.5–21.3 mm. (19.8); forearm 112.5–116 mm. (109–112); median surface ridge distinct in  $m^1$ ,  $m_1$ , and  $m_2$  (in *pannietensis* distinct in  $m^1$  and  $m_2$ , absent or obsolete in  $m_1$ ). *Hab.* Celebes, generally distributed.

Type:—♀ ad., skin and skull; Tomohon, Minahassa, 10 Oct., 1894. Collected by Drs. P. and F. Sarasin. B.M. 99. 10. 1. 4.

Specimens examined, seven, from the following localities:—Minahassa (one), Menado (two), Gorontalo (one), Macassar (one), “Celebes” (two).

### *Dobsonia sumbana*, sp. n.

Closely allied to *D. peroni*, but noticeably smaller: skull, total length 46.5 (48.8–51.7 in *peroni*), maxillary tooth-row 18.8 mm. (20–22), forearm 106 mm. (108.5–117). *Hab.* The island of Sumba, Timor group.

Type:—Ad. al., with skull; Sumba, 3 Oct., 1896. Collected by A. Everett. B.M. 97. 4. 18. 12.

*Dobsonia crenulata*, sp. n.

Allied to *D. viridis*, but larger and with conspicuously heavier dentition; maxillary tooth-row 20–21 mm. (18·5–19·5 in *viridis*), forearm 125–128·5 mm. (113–117·5). *Hab.* Gilolo group, generally distributed.

Type:—♀ subad., skin and skull; Ternate. Collected by Dr. A. R. Wallace. B.M. 60. 8. 26. 2.

Specimens examined, eleven, from the following localities:—Rau (four), Morotai (two), Ternate (one), Batchian (four).

*Dobsonia prædatrix*, sp. n.

Allied to *D. viridis* and *crenulata*, but cranial rostrum considerably heavier (across lower edges of lachrymal foramina 12·8–13·8 mm.); general size very nearly as *D. viridis*, smaller than *D. crenulata*: forearm 111·5–121·5 mm. *Hab.* Bismarck Archipelago.

Type:—Imm. sk., with skull; Duke of York group. Collected by the Rev. G. Brown. B.M. 77. 7. 18. 5.

Specimens examined, five.

*Dobsonia inermis*, sp. n.

A small species of the *D. viridis* group: forearm 105·5–109 mm.; premaxillæ and upper canines not slanted more strongly forward than usual. *Hab.* East Solomon Islands.

Type: ♀ ad., skin and skull; San Christoval, Dec. 1854. Collected by Dr. F. M. Rayner (Voyage of the 'Herald'). B.M. 56. 7. 7. 5.

Specimens examined, two, from San Christoval and Ugi.

*Dobsonia nesea*, sp. n.

Allied to *D. inermis* and very nearly of the same general size, but premaxillæ and upper canines slanted peculiarly forward (tip of nasals vertically above hinder edge (in *D. inermis* above front half) of alveole of canine); premolars and molars larger, but not differing in structure. Forearm about 109·5 mm. *Hab.* W. and C. Solomon Islands.

Type:—♂ ad., skin and skull; Alu, Shortland, Apr. 1886. Collected by C. M. Woodford, Esq. B.M. 87. 1. 18. 8.

Specimens examined, three, from Shortland (one) and Rubiana (two).

III. *Primary Sections of Genus.*

The premolars and molars of *Dobsonia* present four different phases of specialization, which may be utilized for a subdivision of the genus into four apparently natural sections, as follows:—

(1) *D. minor* section:—Premolars and molars simple, *i. e.* no distinct posterior basal ledge (a slight indication sometimes seen in  $p_1$  and  $m_1$ ), no distinct antero-internal basal cusp (a faint indication may be seen in  $p^1$ ), no trace whatever of surface ridges. One species, *D. minor* (N.W. New Guinea).

(2) *D. moluccensis* section:—A well-developed posterior basal ledge in  $p^3$ ,  $p^4$ ,  $p_3$ , and  $p_4$ ; a well-marked antero-internal basal ledge or cusp in  $p^1$  and  $p^4$ , generally at least a trace of a similar ledge in  $p_3$  and  $p_4$ , but never in  $m_1$ ; surface ridges in  $m^1$  and  $m_2$ , sometimes also in  $p^1$  and  $m_1$ . Four species:—*D. exoleta*, *pannietensis*, *moluccensis*, and *magna*. *D. exoleta* (Celebes) and *pannietensis* (Islands S.E. of New Guinea), though geographically widely separated, are evidently closely related; the broad intervening area is occupied by the allied but much larger *D. moluccensis* (Amboina group and Aru Islands) and *magna* (New Guinea).

(3) *D. peroni* section:—Essentially as foregoing, but with a strong antero-internal ledge also as in  $m_1$ , but not in  $m^1$ . Two species, *D. peroni* (Flores, Timor, Alor, Wetter) and *sumbana* (Sumba).

(4) *D. viridis* section:—Essentially as foregoing, but a strong antero-internal ledge also in  $m^1$ , this ledge therefore well-differentiated in  $p^3$ ,  $p^4$ ,  $m^1$ ,  $p_3$ ,  $p_4$ , and  $m_1$ ; posterior basal ledges still more strongly developed, as are generally also the surface ridges; outer and inner longitudinal ridges of  $p^4$ ,  $m^1$ ,  $p_4$ , and  $m_1$  (or at least some of these teeth but rarely also  $p^3$  and  $p_3$ ) showing a more or less distinct tendency to break up into two or three separate cusps. Five species:—*D. viridis* (Amboina group and Key Islands), *crenulata* (Gilolo group), *prædatrix* (Bismarck Archipelago), *nesea* (W. and C. Solomon Islands), and *inermis* (E. Solomon Islands). Although, as here indicated, the section is represented in the Molucas, Bismarck Archipelago, and Solomon Islands, no species with similar dental characters is known from New Guinea.



LXVII.—*Diagnoses of new Mammals collected by Mr. H. C. Robinson in the Islands of the Straits of Malacca.* By OLDFIELD THOMAS and R. C. WROUGHTON\*.

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THE following are diagnoses of some new mammals obtained by Mr. H. C. Robinson in the Islands of Langkawi and Terutau, and presented by the Government of the Confederated Malay States to the National Museum. The fuller descriptions, with a detailed list of the collection from the Islands, will be published in the Journal of the Museum at Selangor.

1. *Presbytis obscura carbo*, subsp. n.

A local race of *P. obscura*, characterized by its darker colouring in all details. Colour above black, paler and suffused with reddish on the shoulders and anterior middle back; below dark brown. Nuchal patch pale drab-grey. Thighs and tail dark grey. Hands and feet black.

*Hab.* Langkawi and Terutau Islands, Straits of Malacca (type from Langkawi).

*Type.* Adult male. B.M. no. 9. 11. 1. 4. Original number 2373. Collected 25th February, 1909.

Three specimens examined.

2. "*Pteropus hypomelanus robinsoni*, Andersen, subsp. n.

"Similar to *Pt. hypomelanus tomesi*, but mantle, breast, and belly considerably lighter in colour. The same character discriminates it from *Pt. h. condorensis*, from which it is further distinguished by the more blackish, less brown colour of the back. From *Pt. h. canus* and *lepidus* it is separable by the much darker colour of the back, the lighter colour of the mantle, breast, and belly, and the perfectly normal size of the teeth. Finally, it is easily recognizable from *Pt. h. annectens* by the much darker colour of the back.

"*Hab.* Rumbia Island, Straits of Malacca.

"*Type.* Adult female. B.M. no. 9. 11. 1. 8. Original number 1779. Collected 5th March, 1909.

"Three specimens examined."

\* The new *Pteropus* by Knud Andersen.

3. *Tupaia lucernata*, sp. n.

Closely allied to *T. ferruginea*, but distinguished by its smaller size and more yellow colouring, especially between the shoulders and on upper back.

*Hab.* Islands of Langkawi and Terutan, Straits of Malacca (type from Langkawi).

*Type.* Adult female. B.M. no. 9. 11. 1. 30. Original number 2673. Collected 18th March, 1909.

Seventeen specimens examined.

4. *Ratufa melanopepla fretensis*, subsp. n.

An island race of *melanopepla* distinguished by the darker colouring of the lower surface of the body, being "tawny" instead of at most "ochraceous" as in typical *melanopepla*. *R. m. tiomanensis* is smaller and even darker-coloured.

*Hab.* Langkawi and Terutan Islands, Straits of Malacca (type from Langkawi).

*Type.* Adult male. B.M. no. 9. 11. 1. 37. Original number 2217. Collected 8th February, 1909.

Eight specimens examined.

5. *Sciurus concolor terutavensis*, subsp. n.

Closely resembling *S. c. lancavensis*, Miller, in size and coloration, but immediately distinguishable by wanting the silvery-white suffusion on the belly and by having the midrib of the tail below and the bases of the hairs of each side to a length of 5-6 mm. coloured ochraceous buff.

*Hab.* Terutan Island, Straits of Malacca.

*Type.* Adult male. B.M. no. 9. 11. 1. 54. Original number 2580. Collected 7th March, 1909.

Ten specimens examined.

6. *Mus vociferans tersus*, subsp. n.

Rather smaller than *M. v. lancavensis* and darker than that form, but at the same time without the markedly darker dorsal area characteristic of typical *vociferans*. Dark upper-side of tail extending for fully half its length, as in the mainland animal. Tail rather shorter than in *lancavensis*, markedly shorter than in the Trong form.

*Hab.* Terutan Island, Straits of Malacca.

*Type.* Old male. B.M. no. 9. 11. 1. 80. Original number 2489. Collected 4th March, 1909.

Nineteen specimens examined.



7. *Tragulus canescens terutus*, subsp. n.

Closely resembling *T. canescens* in coloration, but markedly smaller. The dark-coloured nape characteristic of *umbrinus*, Miller, entirely wanting.

*Hab.* Terutau Island, Straits of Malacca.

*Type.* Adult male. B.M. no. 9. 11. 1. 159. Original number 2438. Collected 26th October, 1909.

Seven specimens examined.

LXVIII.—*East African Forms of Arvicanthis abyssinicus.*

By R. C. WROUGHTON.

HAVING had occasion to lay out the specimens in the Natural History Museum of *Arvicanthis* from British Africa, I find that several well-marked local races can be distinguished. *Arvicanthus abyssinicus* was described by Rüppell from Simen and Shoa in Abyssinia. Besides cotypes, the Museum possesses quite a long series from many parts of Abyssinia. Thence to German East Africa, whence Matschie described his *A. neumanni* (a very much smaller animal), the only name I have been able to find is *nairobæ*, Allen. This is clearly a geographical race of *abyssinicus*, which it resembles in colour and from which it differs chiefly in size.

The additional forms I have been able to discriminate are: one from Naivasha, closely resembling *nairobæ*, its near neighbour, in size and colour, but easily separable by the shape of the skull; also a reddish colour variety from Unyoro, and a blackish one from Mt. Elgon.

*Key to the Subspecies of A. abyssinicus.*

- A. General colour greyish (near "hair-brown").
- a. Size larger; hind foot=30 mm., greatest length of skull=36. Hands and feet grey. (Abyssinia.) (1) *abyssinicus*, Rüpp. (s.s.)
  - b. Size smaller; hind foot=27 mm. or less, greatest length of skull=34 or less.
    - a'. Hands and feet grey; skull very broad and stoutly built, supra-orbital crests strongly marked. (Nairobi.) (2) *a. nairobæ*, Allen.
    - b. Hands and feet yellow; skull narrow, slenderly built, supraorbital crests much less developed. (Naivasha.) (3) *a. præceps*, subsp. n.